(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau





(43) International Publication Date 6 May 2004 (06.05.2004)

PCT

(10) International Publication Number WO 2004/038484 A3

(51) International Patent Classification7: G02B 21/32, 21/22, 21/36, G03B 35/00, H04N 13/00, G01N 15/14

(21) International Application Number:

PCT/EP2003/011818

- (22) International Filing Date: 24 October 2003 (24.10.2003)
- (25) Filing Language:

(26) Publication Language:

English

(30) Priority Data: 02292658.8

25 October 2002 (25.10.2002)

- (71) Applicants (for all designated States except US): **GMBH TECHNOLOGIES** Merowingerplatz 1a, 40225 Düsseldorf (DE). INSTI-TUT PASTEUR [FR/FR]; 25-28, rue du Docteur Roux, F-75015 Paris (FR).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): SHORTE, Spencer [GB/FR]; 4bis, rue du Fond du Guichet, F-91400 Orsay (FR). MÜLLER, Torsten [DE/DE]; Hartriegelstrasse 39,

12439 Berlin (DE). SCHNELLE, Thomas [DE/DE]; Koppenstrasse 65, 10243 Berlin (DE).

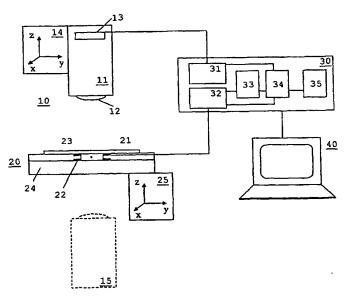
- (74) Agent: HERTZ, Oliver; v. Bezold & Sozien, Akademiestrasse 7, 80799 München (DE).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK. LR. LS. LT. LU. LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

with international search report

[Continued on next page]

(54) Title: METHOD AND DEVICE FOR 3 DIMENSIONAL IMAGING OF SUSPENDED MICRO-OBJECTS PROVIDING **HIGH-RESOLUTION MICROSCOPY**



(57) Abstract: A method for high-resolution image recording of at least one object with a microscope, comprises the steps of: positioning the object in a receptacle being arranged in the optical axis of the microscope, generating at least two first data sets per object which represent intermediate images of the object with at least two different orientations relative to the optical axis of the microscope, wherein the different orientations of the object are provided by moving the object relative to the receptacle, and evaluating the data sets for obtaining quantitative three dimensional information.



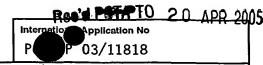
W 2004/038484 A3



- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- (88) Date of publication of the international search report: 27 May 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT



A. CLASSIFICATION OF SUBJECT MATTER IPC 7 G02B21/32 G02B21/22 G01N15/14

G02B21/36

G03B35/00

H04N13/00

10/532147

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

 $\begin{array}{ll} \mbox{Minimum documentation searched} & \mbox{(classification system followed by classification symbols)} \\ \mbox{IPC 7} & \mbox{G02B} & \mbox{H04N} & \mbox{G03B} & \mbox{G01N} \\ \end{array}$

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

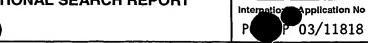
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 96 24875 A (SCHWERTNER DIETMAR; SCHWERTNER MICHAEL (DE)) 15 August 1996 (1996-08-15) abstract page 10, line 5 - line 34 page 11, line 1 - line 2 figure 5	1-22
A	WO 00 37920 A (FUHR GUENTER ;GRADL GABRIELE (DE); MUELLER TORSTEN (DE); SCHNELLE) 29 June 2000 (2000-06-29) abstract page 8, line 10 - line 12 page 8, line 22 - line 24 page 9, line 19 - line 34 figures 1,3	1-22

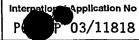
Further documents are listed in the continuation of box C.	Patent family members are listed in annex.
Special categories of cited documents: A* document defining the general state of the art which is not considered to be of particular relevance E* earlier document but published on or after the international filling date C* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) O* document reterring to an oral disclosure, use, exhibition or other means P* document published prior to the International filling date but later than the priority date claimed	 "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family
Date of the actual completion of the International search 26 March 2004	Date of mailing of the international search report 05/04/2004
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Authorized officer Seibert, J

INTERNATIONAL SEARCH REPORT



		P 03/11818
C.(Continua	ation) DOCUMENTS CONSIDERED TO BE RELEVANT	
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Α	US 6 440 285 B1 (FUHR GUENTER) 27 August 2002 (2002-08-27) abstract column 6, line 1 - line 12 figures 1,2	1–22
A	EP 0 517 454 A (JAPAN RES DEV CORP) 9 December 1992 (1992-12-09) abstract	1–22
A	DE 199 03 001 A (EVOTEC BIOSYSTEMS AG) 24 August 2000 (2000-08-24) abstract; figures	1-22
A	US 2002/050988 A1 (ABADJEV VADIM ET AL) 2 May 2002 (2002-05-02) abstract; figures	1–22
A	US 5 948 328 A (HAGEDORN ROLF ET AL) 7 September 1999 (1999-09-07) abstract; figures 1,4	1-22
A .	DE 197 57 785 A (FUHR GUENTER PROF DR) 15 July 1999 (1999-07-15) abstract claim 9 figures 1,2	1-22

INTERNATIONAL SEARCH REPORT



	ent document in search report	ľ	Publication date		Patent family member(s)		Publication date
WO S	9624875	A	15-08-1996	DE DE DE WO EP	19504108 A 19519687 A 59610763 D 9624875 A 0808474 A	\1 \1 \1	14-08-1996 12-12-1996 13-11-2003 15-08-1996 26-11-1997
WO	0037920	Α	29-06-2000	DE WO	19859460 A 0037920 A		27-07-2000 29-06-2000
US	6440285	B1	27-08-2002	DE AT DE WO EP JP	19653661 (224047] 59708216 [9828604 / 1025428 / 2002512681]	T 01 A2 A2	20-05-1998 15-09-2002 17-10-2002 02-07-1998 09-08-2000 23-04-2002
EP	0517454	A	09-12-1992	DE JP JP EP US CA	4231004 / 3129471 4354532 / 0517454 / 5308976 / 2069982 /	B2 A A2 A	17-03-1994 29-01-2001 08-12-1992 09-12-1992 03-05-1994 02-12-1992
DE	19903001	A	24-08-2000	DE WO EP	19903001 / 0045147 / 1155303 /	A2	24-08-2000 03-08-2000 21-11-2001
US	2002050988	A1	02-05-2002	US	2001056308	A1	27-12-2001
US	5948328	A	07-09-1999	DE AT WO DE EP JP	4434883 171393 9523020 59503701 0746408 10501454	T A1 D1 A1	31-08-1995 15-10-1998 31-08-1995 29-10-1998 11-12-1996 10-02-1998
DE	19757785	A	15-07-1999	DE AT DE WO EP JP	19757785 221305 59804934 9934653 1042944 2002500110	T D1 A1 A1	15-07-1999 15-08-2002 29-08-2002 08-07-1999 11-10-2000 08-01-2002